

EXHIBIT 5

In The Matter Of:

*THE CITY OF NEW YORK, ET AL
EXXON MOBIL CORPORATION, ET AL*

*VOLUME 22
September 2, 2009*

*TRIAL
SOUTHERN DISTRICT REPORTERS
500 PEARL STREET
NEW YORK, NY 10007
212-805-0300*

Original File 992dcitf.txt, Pages 3174-3367 (194)

Word Index included with this Min-U-Script®

[1] Q. Do you also clarify MTBE as mutagenic?

[2] A. Yes, sir.

[3] THE COURT: I think we should pause one more time.
 [4] Once again, I know you may have done this, so I apologize.
 [5] What does mutagenic mean?

[6] THE WITNESS: Mutagenic, breaking it down, means a
 [7] change in the way the DNA or RNA in an animal or human can
 [8] express itself. We normally code for a certain way of DNA and
 [9] RNA to help the development in a human body from the time that
 [10] they are first conceived, from the time the fetus is
 [11] developing. There is a process by which genetic coding makes
 [12] us what we are, whatever we are, whatever we look like and
 [13] however we are.

[14] A mutation is a situation where a chemical is either
 [15] binding or breaking up a DNA molecule in such a fashion that it
 [16] changes the basic, normal pathway that you would have expected
 [17] somebody to develop, say, tissue, like a neurological cell,
 [18] neurons or liver tissue or something like that.

[19] THE COURT: Is this the science of gene expression?

[20] THE WITNESS: It is gene expression at its worst, I
 [21] guess.

[22] THE COURT: What is a DNA adduct?

[23] THE WITNESS: A DNA adduct is essentially where a
 [24] chemical is attaching itself to the DNA molecule and by doing
 [25] that it changes how the DNA is going to code for something.

[1] That is one of the ways you cause a mutation.

[2] THE COURT: That's part of mutagenicity, too?

[3] THE WITNESS: Yes, ma'am. You can form an adduct that
 [4] may not pose any kind of adverse risk at all and you may form
 [5] an adduct that may pose an adverse risk. In a case where you
 [6] have a chemical that you know is an animal carcinogen at the
 [7] very least and you have partial mutagenic damage in both animal
 [8] lines and human lines, then it sort of raises your concern
 [9] level.

[10] THE COURT: Is it a mutagenic effect to have an
 [11] adduct, DNA adduct?

[12] THE WITNESS: It's the product of the adduct itself
 [13] that could give you an effect.

[14] THE COURT: Could be a mutagenic effect?

[15] THE WITNESS: Yes.

[16] THE COURT: Thank you.

[17] BY MR. CHAPMAN:

[18] Q. Dr. Rudo, MTBE, in your opinion, is a probable human
 [19] carcinogen and also it's mutagenic?

[20] A. Yes, sir.

[21] Q. Does that mean that even at the lowest levels of exposure,
 [22] say, in drinking water, that can cause a mutation which can
 [23] possibly lead to cancer?

[24] A. Yes, sir.

[25] Q. Now, sir, from the standpoint of the North Carolina state

[1] toxicologists, do you treat detections of MTBE in groundwater
 [2] as detections of a probable human carcinogen?

[3] A. Yes, sir.

[4] Q. In your work on behalf of the State of North Carolina, do
 [5] you deal with subjects of MCL's and groundwater standards?

[6] A. Yes, sir.

[7] Q. What are MCL's?

[8] A. MCL, as EPA defines it, is called a maximum contaminant
 [9] level. It is a term that EPA uses for public drinking water
 [10] systems, like a city water system, something like that. What
 [11] it is it is defined as an economic, technologically feasible
 [12] standard which they set for public water supplies. It is not a
 [13] health-based standard.

[14] It starts out with a health-based standard, but then
 [15] they apply economic and technologically feasible parts to it.
 [16] In a public water system you have to set a standard in a manner
 [17] by which a water company, a water treatment company, can
 [18] control it from an economic standpoint. So it has to take that
 [19] into account.

[20] In the EPA process, once you put those factors in
 [21] there and you go through the public review process that is very
 [22] rigorous in setting these MCL's, you usually have an MCL that
 [23] is far from the original health-based number. So it is not in
 [24] the end a health-based number.

[25] Q. What is a groundwater standard?

[1] A. Groundwater standard, I will define it as we do in North
 [2] Carolina. A groundwater standard is a health-based standard.
 [3] In North Carolina it's by law that we do that. We use science-
 [4] based information to set a health protective level to protect
 [5] the groundwater resource itself. So that is strictly a health-
 [6] based standard.

[7] Q. Have you been involved in attempting to change the
 [8] groundwater standard in North Carolina?

[9] A. One of my job functions since the day I came here has been
 [10] to actually recommend groundwater standards for the laws in
 [11] North Carolina. I'm not a regulator. My job is they come to
 [12] me, they say calculate what would be a health protective level
 [13] for a certain chemical in groundwater. I do that, and then we
 [14] submit it to our environmental management commission. They put
 [15] it through a review process before they set the standard.

[16] MR. STACK: Your Honor, this is an issue that is
 [17] likely irrelevant, but I don't have a problem with him
 [18] discussing the concept.

[19] THE COURT: I agree. I will explain to the jury.
 [20] This may not be what we call directly on point, but they don't
 [21] really object to it otherwise. I will inform the jury it may
 [22] not be relevant here.

[23] MR. STACK: Yes. I would object further, Judge, if
 [24] there is discussion of what it is in North Carolina.

[25] THE COURT: No, I don't think that is appropriate.

In The Matter Of:

*THE CITY OF NEW YORK, ET AL v.
EXXON MOBIL CORPORATION, ET AL*

*VOLUME 39
September 21, 2009*

*TRIAL
SOUTHERN DISTRICT REPORTERS
500 PEARL STREET
NEW YORK, NY 10007
212-805-0300*

Original File 99LDCITF.txt, Pages 5160-5333 (174)

Word Index included with this Min-U-Script®

[1] **A.** Well, the smoke from a smokestack illustrates a couple of
[2] concepts of contaminant transport.

[3] One would be a plume will reach some stabilized length
[4] or distribution of impact on groundwater just as the smoke
[5] leaving a smokestack would. If you look out as you're driving
[6] by, you'll see smoke coming out of a smokestack. At some point
[7] the smoke disappears. It is because the particles or whatever
[8] is producing that smoke is mixed with the air and at some point
[9] you can no longer can visually see that smoke.

[10] Groundwater contaminant plumes go through the
[11] attenuation processes I described before. That same process
[12] generally occurred. At some point you can no longer find
[13] detectable concentrations as you move downgrading or away from
[14] where the source of contamination is.

[15] That length of the smoke coming out of the smokestack
[16] or the length of the groundwater contaminant plume is dictated
[17] in part by how much contamination is being dissolved at the
[18] source, the rate of that contamination dissolved at the source.

[19] As I said on Thursday, that is a term that, as a
[20] contamination hydrogeologist, the term we use is mass flux.
[21] That is a term that defines the rate that new contamination is
[22] being added to the system.

[23] You can also think of a groundwater flow system as a
[24] conveyor belt. To maintain a plume of contamination, it is
[25] smoke from a smokestack or dissolved plume in groundwater, you

[1] have to keep adding contamination to the conveyor belt, which
[2] is the groundwater flow system. That rate you're adding
[3] defines how long this plume will become.

[4] When you compare that rate that contamination is being
[5] added to the capacitor, the aquifer to offset that or attenuate
[6] that contamination, that is that whole concept of life cycle,
[7] how long will this plume become before it reaches some kind of
[8] stabilized condition.

[9] It is that balance between the rate of contamination
[10] is being introduced at the source and the capacitor of the
[11] aquifer to offset that contamination that defines the life
[12] cycle of a plume.

[13] **Q.** Will that also define how long the plume from a particular
[14] source may be in groundwater?

[15] **A.** Yes. Again that is a function of the balance between the
[16] rate it is being introduced at the source and the rate it is
[17] being attenuated by the aquifer.

[18] **Q.** Now, when the remediation takes place and the contamination
[19] at the site, the dirt is dug up, how does that relate to your
[20] analogy of a smokestack?

[21] **A.** What you're doing is reducing the amount of contamination
[22] at the source so then ultimately reducing the rate that that
[23] contamination can be introduced into the groundwater system.
[24] You're pumping less smoke out of your smokestack.

[25] **Q.** What information do you need to assess how far a plume will

[1] go when you use a mass flux analysis?

[2] **A.** Generally mass flux calculations can be done in the order
[3] of magnitude calculations source of screening level
[4] calculations. There are three data you need.

[5] One will be the groundwater velocity, the area, the
[6] source area at the site, how big is this area where the
[7] contamination exists or was released and then the average
[8] concentration in that source area.

[9] **Q.** Now, the jury has seen service stations which are
[10] identified within the plume. If we can go to Slide No. 3. Go
[11] back to Merrick.

[12] We talked about the 113-21 Merrick Boulevard site. Do
[13] you recall that, Mr. Maguire?

[14] **A.** Yes, I do.

[15] **Q.** In the context of the analysis that was done by Mr. Terry,
[16] if we look at Slide 43, the 113-21 Merrick Boulevard station is
[17] located within the year 1 capture zone. Am I correct?

[18] **A.** That's correct.

[19] **Q.** Will a release at the service station at 113-21 Merrick
[20] result in a detectable concentration of MTBE in the future in
[21] all cases?

[22] **A.** Well, no. I know what the concentrations are at the site.

[23] There are two generally two factors that need to be
[24] considered whether a release site would affect or produce
[25] concentrations, detectable concentrations of contamination in

[1] the supply well. One is first whether the site is truly in the
[2] capture zone. I have identified a number of problems with
[3] Mr. Terry's model, groundwater flow model. I don't think it
[4] accurately and fairly represents groundwater flow in this area;
[5] and, therefore, doesn't fairly represent the capture zones.

[6] The other factor you need to consider is the strength
[7] of the source. Is the mass flux at the site sufficient to
[8] produce a plume that is long enough to sustain transport from a
[9] site to the well to produce detectable concentrations?

[10] So accepting Mr. Terry's model for the purposes of
[11] this discussion, let's assume it is in the capture zone, we
[12] know the distance between 113-21 Merrick Boulevard and the
[13] Station 6 wells is about 2000 feet. So the other relevant fact
[14] to consider is whether this site can produce a plume that is
[15] 2000 feet long.

[16] Assuming the groundwater flow field can be reversed,
[17] right now the groundwater beneath the site is actually moving
[18] to the south and west. It is moving this way under the
[19] regional groundwater flow field. It is not moving towards
[20] Station 6, but assuming pumping of these wells could reverse
[21] the groundwater flow, that is not enough of a test to determine
[22] whether this site will impact these wells.

[23] You have to also consider the mass flux or the
[24] quantity of contamination that is being introduced into that
[25] site to evaluate whether that site will produce a plume 2,000

Page 5176

[1] feet and sustain transport from that site to the wells.
[2] **Q.** With respect to evaluating the mass flux or the quantity of
[3] contamination, you would look at the measured levels of MTBE
[4] beneath the service station?
[5] **A.** Yes, that's right.
[6] **Q.** Go to Slide 5, Dave, again.
[7] With respect to this amount of contamination, can
[8] you explain to the jury what 10.2 represents in terms of mass
[9] flux and the ability to create a 2,000 foot plume?
[10] **A.** When you consider groundwater velocity, you consider the
[11] area that would be a source area like this site and you
[12] consider these concentrations. The mass flux in this site will
[13] generally be substantially less than one gram per day of MTBE
[14] to sustain this concentration, which is 10 micrograms per liter
[15] beneath that site.
[16] That mass flux is insufficient to produce a plume that
[17] will be 2,000 feet long, to sustain a transport, assuming the
[18] groundwater flow can be reverse, to sustain transport to
[19] Station 6 if pumped and produce detectable concentrations.
[20] **Q.** Now, the jury has heard testimony about the 177-97 South
[21] Conduit site. The plume at that site -- look at Slide 9,
[22] please -- the plume at that site was approximately how long?
[23] **A.** About 1200 feet long, I believe.
[24] **Q.** With regard to the 1200 foot long plume, that was the
[25] result of contamination -- go to Slide 11, please --

Page 5177

[1] contamination of what concentration?
[2] **A.** Well, early on in the history of the site you can see there
[3] were substantially elevated concentrations of MTBE. I believe
[4] the maximum was about 170,000 parts per billion. If you do a
[5] mass flux calculation on that concentration, you end up with
[6] several hundred grams per day of MTBE sort of being put onto
[7] the conveyer belt to produce that concentration. That mass
[8] flux does have the capacity to produce a long plume, something
[9] in the range of several thousand feet.
[10] We actually did have a plume at this site produced
[11] about 1200 feet long. Ultimately, though, there was
[12] remediation on the site, remediation off the site, and as you
[13] can see, the concentrations as a result of those clean-up
[14] activities have substantially declined. Now the current
[15] maximum concentration at this site is just about 39 parts per
[16] billion.
[17] **Q.** The contamination at the 177-97 Conduit -- go back to Slide
[18] 9, please, Dave -- so we're clear, in what direction has that
[19] contamination been moving since it was first detected back in
[20] the groundwater at that site in 1996?
[21] **A.** It was and had moved in response to the regional
[22] groundwater flow field to the south and southwest, this
[23] direction down towards the bottom of the page away from Station
[24] 6.
[25] **Q.** If you go to 11, we look at the contamination at that site,

Page 5178

[1] Slide 11, and that generates a plume 1200 feet long?
[2] **A.** Yes -- well, at the point in time you went out and started
[3] cleaning up the contamination.
[4] **Q.** If we looked then at the results for the Merrick site -- go
[5] back to Slide 5 -- with regard to this amount of contamination,
[6] can you form an opinion within a reasonable degree of
[7] scientific certainty concerning the length of a plume that
[8] might be generated by concentrations on the order of 10.2 parts
[9] per billion?
[10] **A.** Yes, it would generally be several hundred feet would be
[11] the maximum length of a plume.
[12] **Q.** Enough to reach a well 2,000 feet away?
[13] **A.** No, it would not sustain transport 2,000 feet.
[14] **Q.** You have looked at other service stations. Go to Slide 18,
[15] please. This particular site was analyzed by Mr. Terry at
[16] 165-01 Hillside Avenue. Did you look at the files pertaining
[17] to this site?
[18] **A.** Yes, I have.
[19] **Q.** Did you prepare a slide summarizing your findings for the
[20] jury?
[21] **A.** Yes, I have.
[22] **Q.** Go to Slide 19, please. Tell the jury what your findings
[23] were relative to this site.
[24] **A.** Well, first, as I've identified all the other sites, I've
[25] identified the relative distance to this site to the Station 6

Page 5179

[1] wells 5,000 feet to the northwest. It is located outside the
[2] capture zone defined by Mr. Cohen, so Mr. Cohen did not
[3] identify this as a site that has historically impacted Station
[4] 6 with MTBE concentrations.
[5] As far as remediation, there has been soil excavation
[6] at this site, 285 tons of soil were excavated in 2007.
[7] **Q.** With regard to the contaminant levels observed on this site
[8] over time, have there been monitoring events which have
[9] monitored the MTBE in groundwater?
[10] **A.** Yes, there have been periodic monitoring events regarding
[11] groundwater quality in this site.
[12] **Q.** Go to Slide 20, please. The tanks are removed in 2007. Is
[13] that correct?
[14] **A.** That's correct.
[15] **Q.** After the tanks are removed, are monitoring wells
[16] installed?
[17] **A.** Yes.
[18] **Q.** Can you tell the jury what this depicts.
[19] **A.** This is, as all the other charts that I've included are
[20] shown for the service station, this represents the maximum
[21] concentration of MTBE in any monitoring well at this site over
[22] time.
[23] So initially there were some elevated concentrations
[24] of MTBE, I believe the maximum was 1770 parts per billion which
[25] would be this data point here. As time has gone on, the

Page 5224

[1] A. Well, accepting that assumption, more likely than not, it
[2] would be a source that's close to Station 6 that would produce
[3] contamination.
[4] Q. Which sources are you referring to?
[5] A. Well, there are three that I've identified as historically
[6] being responsible either individually or together for the
[7] historic contamination of Station 6. That would be the Atlas
[8] site, the Citgo site, and/or the BP site.
[9] Q. Is it your opinion, to a reasonable degree of scientific
[10] probability, that if future contamination were to be detected
[11] using Station 6 as a backup source, it would come from those
[12] stations?
[13] A. Yes. It would more likely come from a local source.
[14] MR. STACK: I have no further questions, your Honor.
[15] THE COURT: All right. Thank you, Mr. Stack.
[16] Mr. Sher.
[17] MR. SHER: Thank you, your Honor.
[18] CROSS-EXAMINATION
[19] BY MR. SHER:
[20] Q. Good morning, sir.
[21] A. Good morning.
[22] Q. Let's start with 165-01 Hillside Avenue.
[23] Now I am going to skip to slide 20, please.
[24] This is your summary of site testing data for MTBE
[25] associated with this station, correct?

Page 5225

[1] A. Yes, the maximum concentration.
[2] Q. The first monitoring result is in January 2008?
[3] A. Yes, that's correct.
[4] Q. And that was after there had been a soil excavation at the
[5] site?
[6] A. Yes. That is when they removed the tanks.
[7] Q. When did the release occur?
[8] A. It's not clear from the site data when the release would
[9] have occurred.
[10] Q. These are measurements of MTBE, correct?
[11] A. Yes.
[12] Q. And MTBE was banned from gasoline in New York as of
[13] January 2004, wasn't it?
[14] A. Yes.
[15] Q. So this release occurred presumably before January 1, 2004?
[16] A. Yes, I would agree.
[17] Q. There was at least four years during which the MTBE
[18] contamination had been released, at least four years, before
[19] there was even a monitoring event, correct?
[20] A. That is certainly possible, yes.
[21] Q. How long a plume would you predict was the maximum flux
[22] from 1770 parts per billion?
[23] A. Well, 1770 is not the mass flux. Mass flux would be in
[24] some units per period of time.
[25] Q. Well, all right. You testified that you thought that the

Page 5226

[1] 88 parts per billion at the last measurement in 2009 was
[2] insufficient mass to support a plume long enough to reach
[3] Station 6, correct?
[4] A. Yes.
[5] Q. What unit of time would you assume from your mass flux
[6] analysis on that?
[7] A. Well, the units in time for mass flux are days. So the
[8] total units for mass flux would be, for example, grams per day.
[9] Q. All right. And --
[10] A. If you looked at the 1770, that would produce a mass flux
[11] probably at about one or less than one gram per day.
[12] Q. For how long, sir? We don't know, do we?
[13] A. Well, you could assume whatever period of time you want.
[14] But what will happen, as I described, is the plume, given that
[15] mass flux, all other conditions remaining a constant, the plume
[16] will reach some stable plume length given that balance between
[17] the source drain and the capacity for aquifer to attenuate
[18] that.
[19] Q. We don't know when the release occurred of MTBE at the
[20] station, do we?
[21] A. No, we do not know exactly.
[22] Q. We don't not know what volume of gasoline was released at
[23] this station, do we?
[24] A. We could make some reasonable assumptions regarding the
[25] volume.

Page 5227

[1] Q. Indeed, given that the first measurement is four years
[2] after and after what was 200 tons of contaminated soils
[3] removed, 285 tons?
[4] A. You could make some assumptions or approximations of the
[5] time of release, yes.
[6] Q. Sir, you don't know whether the release at this site
[7] occurred in 1990 or in 2000, do you?
[8] A. No. It is not necessarily relevant, again, given a certain
[9] mass flux --
[10] Q. You don't know when it occurred, do you?
[11] A. I think I said that, yes.
[12] Q. Right. That was my question.
[13] And you don't know how long the MTBE has been
[14] migrating from that source, do you?
[15] A. Again, without knowing the specific release date, you don't
[16] know that. But what you do know is what the relevant strength
[17] of the source is and its capacity to produce a relative length
[18] plume.
[19] (Continued on next page)

Page 5240

[1] chart, specifically say which do and do not, but there are, as
[2] I said, graphics in his report identifying which of these
[3] stations by designation as Station 6-3003, for example, whether
[4] they fall within this capture zone.
[5] **Q.** I am asking about your testimony and your ability to
[6] identify off of your demonstrative which of the stations fall
[7] within or without of the state's 6 capture zone, the fixed one,
[8] the 32 year one?
[9] **A.** I have not included a column on this chart to identify
[10] whether it falls within or outside its capture zone,
[11] recognizing the capture zone changes over time.
[12] **Q.** Let's actually talk about that for a minute.
[13] Lets let's start with your demonstrative. Could I
[14] impose again, could I have Slide 43, please -- actually, 46.
[15] Now, you told us that this is Mr. Terry's early
[16] capture zone when the Station 6 wells are turned on, Station 24
[17] is on, but it is before the dependability wells are turned on,
[18] correct?
[19] **A.** That's correct.
[20] **Q.** When Mr. Terry did his analysis, assuming Station 6 came on
[21] in 2016, this would be the most established at this capture
[22] zone would be assuming that the dependability wells come on in
[23] 2020?
[24] **A.** If I follow your question, the most fully formed capture
[25] zone between the dependability wells come on.

Page 5241

[1] **Q.** Yes, that is what I am trying to say.
[2] **A.** I think that's right, yes.
[3] **Q.** You looked at 113-21 Merrick Boulevard which falls within
[4] that capture zone, correct?
[5] **A.** Yes.
[6] **Q.** In fact, that station falls within every iteration of Mr.
[7] Terry's capture zone, doesn't it?
[8] **A.** I think it might, yes.
[9] **Q.** Did you look at any of the other Exxon/Mobil gas stations
[10] that would be in the capture zone in this iteration of the --
[11] that is, before the dependability wells come on?
[12] **A.** Look at them in what respect?
[13] **Q.** Well, consider any stations that were located that would
[14] fall within the capture zone when it was this shape?
[15] **A.** Well, I looked at them, as I described before, to see what
[16] files and what information was available, to see if there was a
[17] release at those sites.
[18] **MR. SHER:** These should have been arranged in groups,
[19] but I can hand out packets instead. They're grouped by slide.
[20] (Pause)
[21] **BY MR. SHER:**
[22] **Q.** Let me sort this out and make sure I give you the right
[23] ones. These are in reverse order.
[24] **A.** Okay.
[25] **Q.** I will ask you about them in the other order.

Page 5242

[1] **MR. SHER:** Liz, if you can bring up 2019 A, please.
[2] **BY MR. SHER:**
[3] **Q.** This is another version of a slide we were just looking at
[4] that you had prepared, and on this, on this slide marked in
[5] yellow squares with red dots are Exxon/Mobil stations that have
[6] reported gasoline releases.
[7] Did you consider -- and you'll see right here is the
[8] Merrick Boulevard station that we have been discussing -- did
[9] you consider as part of your analysis at all the station at
[10] 179-18 -- Liz, can you blow up the plume portion -- did you
[11] consider at all in your analysis the station at 179-18
[12] Hillside?
[13] **A.** You represented the yellow box with the red dot as
[14] Exxon/Mobil stations with reported releases. I am not aware of
[15] a reported release at that particular site.
[16] **Q.** Did you examine information concerning that site?
[17] **A.** This was the subject of my discussion when we look at the
[18] other identified Exxon/Mobil sites. There are limited data
[19] available, but my recollection is but for one, there were no
[20] reported releases.
[21] **Q.** Didn't you only look at sites that were in the 32 year
[22] fixed capture zone?
[23] **A.** Well, the universe of sites I looked at were the sites I
[24] believe you had identified last week during your opening.
[25] **Q.** That included all of the stations on the original map or

Page 5243

[1] just the ones that counsel provided to you that were within the
[2] final capture zone?
[3] **A.** Honestly, I am not quite certain. It was your
[4] representation, I believe, of the universe of sites, and I
[5] looked at those sites. That is not quite clear to me.
[6] **Q.** Did you look at a site at 84-12 164th Street?
[7] **A.** I don't recall now.
[8] **Q.** Sir, let's go back to your Slide 42. We can't do that, can
[9] we? Is the station at 84-12 164th Street on your list?
[10] **MR. STACK:** Your Honor, I object to this line of
[11] questioning. If you want, I'll state the objection in open
[12] court. It may not be appropriate to do so.
[13] **MR. SHER:** We can do a sidebar if you like.
[14] **THE COURT:** We are very close to the lunch recess,
[15] although, as I said, it has been kind of a choppy and slow
[16] morning, but we have to take it sometime.
[17] **MR. STACK:** It might be appropriate, your Honor.
[18] **THE COURT:** I know you think so. It is not the best
[19] for me. It should be more important --
[20] **MR. SHER:** We can set this issue aside and I can move
[21] on to something else and we can come back to it.
[22] **THE COURT:** All right. I prefer that.
[23] **MR. SHER:** I am happy to do that.
[24] **BY MR. SHER:**
[25] **Q.** Can we turn to 84-04 Parsons Boulevard. If I could have

[1] AFTERNOON SESSION
[2] 2:15 pm
[3] (Trial resumes)
[4] (In open court; jury not present)
[5] **THE COURT:** We left off with the discussion just
[6] before lunch. You know it?
[7] **MR. SHER:** Yes, I understand.
[8] **THE COURT:** I am not sure how explicit a ruling it
[9] was, but as long as you got it, that is fine.
[10] Call in the jury. My clerk was inquiring about food.
[11] I don't have an interest in food, so you can act as you wish.
[12] In other words, if you would like to order food without me,
[13] that is okay, too, because I don't know how long it will be. I
[14] don't know if it will take three hours or four hours or five
[15] hours. I don't know. You have to use your own judgment as far
[16] as food.
[17] (Jury present)
[18] THOMAS FRANCIS MAGUIRE, resumes
[19] CROSS-EXAMINATION (Continued)
[20] **BY MR. SHER:**
[21] **Q.** If could bring up, Mr. Maguire, Slide 12.
[22] When we broke, we were talking about 84-04 Parsons
[23] Boulevard, and you testified this morning that of the three
[24] factors that you listed that were important to understanding
[25] contamination in groundwater.

[1] **A.** Yes, it is.
[2] **Q.** If we could go to your Slide 5, can you explain the
[3] relationship between the geoprobe data from 2001 and the
[4] groundwater monitoring data that you showed starting in April
[5] or May of '03?
[6] **A.** Certainly. This is something I discussed in my prior
[7] testimony. Geoprobe is a technique to explore the subsurface
[8] at, for example, a gasoline service station site.
[9] Basically a rod is driven down through the soils, and
[10] at some point that rod extends into the water table itself, and
[11] the groundwater sample is collected through that rod; that is,
[12] made its way down through the soils.
[13] A number of soils have looked at whether the geoprobe
[14] data fairly and accurately represent the groundwater conditions
[15] as compared to monitoring wells ultimately installed in the
[16] same area.
[17] **Q.** What I am asking is why you included the 1500 PPE data site
[18] data point on this graph in relation to the others?
[19] **A.** Sorry. Because it is a data point for the site and the
[20] graph is meant to represent the maximum MTBE concentration at
[21] the site. It was a groundwater sample, although the concern I
[22] have about it, and I explained this before, the geoprobe
[23] samples can be affected by the soils that the rod is driven
[24] through, so you can get elevated concentrations in geoprobe
[25] samples as compared to --

[1] Flow is one of them, correct?
[2] **A.** Groundwater flow velocity.
[3] **Q.** Direction is important, too, is it not?
[4] **A.** It can be.
[5] **Q.** With respect to 84-04 Parsons Boulevard, we don't know the
[6] groundwater flow, do you?
[7] **A.** We don't know the direction of groundwater flow in the
[8] regional aquifer.
[9] **Q.** In the regional aquifer, which is the more important one
[10] for longer transport of contamination, correct?
[11] **A.** The question you asked before, does it have a greater
[12] potential to move contamination, and the answer is yes.
[13] **Q.** So for this 20-year-old site that is still open, we don't
[14] know the groundwater flow, correct, according to your
[15] testimony?
[16] **A.** We know the groundwater flow direction in the perch. We
[17] don't have sufficient data to define the groundwater flow
[18] direction in the regional aquifer.
[19] **Q.** If we could turn to the 113-21 Merrick Boulevard site,
[20] which is Slide 3 in your presentation.
[21] This is actually one of the reported spills that is
[22] closest to Station 6 of all spills, correct?
[23] **A.** Of the Mobil sites we discussed, yes.
[24] **Q.** This is still an open petroleum spill on this property. Am
[25] I right about that?

[1] **Q.** You don't know when the spill occurred on this site, do we?
[2] **A.** That's correct, we don't know specifically when.
[3] **Q.** We don't know what volume was released?
[4] **A.** Again we don't know specifically, but again you can make
[5] certain determinations based on the concentrations at this
[6] site.
[7] **Q.** This site is now 10 years' old and still open. Am I right?
[8] **A.** The first data point was collected in 2001 and it is now --
[9] it is 2009, about 800.
[10] **Q.** Wasn't the spill report in '99?
[11] **A.** It might have. Might be. I just don't recall.
[12] **Q.** Again we don't know when the first release of MTBE occurred
[13] from the site, correct?
[14] **A.** We don't know specifically.
[15] **Q.** Do we know generally?
[16] **A.** Well, we know what occurred more likely certainly after
[17] MTBE was used in gasoline. We have some end points to put on
[18] it.
[19] **Q.** It happened sometime between roughly the mid-80's and 1999?
[20] **A.** That would certainly -- those would be the end points I
[21] would define, yes.
[22] **Q.** Has there been any active remediation at the site?
[23] **A.** Yes, I believe there is slow vapor traction.
[24] **Q.** And there has been some soil removal as well in 2001,
[25] correct?

In The Matter Of:

*THE CITY OF NEW YORK, ET AL v.
EXXON MOBIL CORPORATION, ET AL*

*VOLUME 37
September 24, 2009*

*TRIAL
SOUTHERN DISTRICT REPORTERS
500 PEARL STREET
NEW YORK., NY 10007
212-805-0300*

Original File 99odcitf.txt, Pages 5797-5985 (189)

Word Index included with this Min-U-Script®

Page 5885

[1] that refer to?

[2] **A.** Basically, over time your equipment will wear out and

[3] you'll have to replace it periodically. So I've included costs

[4] related to replacement of the GAC vessels and piping as it

[5] wears out over time.

[6] **Q.** How long did you assume -- well, let me come back to that

[7] in a minute.

[8] And then the next column is, it says, "O&M Cost."

[9] What does that mean?

[10] **A.** "O&M" stands for operation and maintenance. That's

[11] basically the costs to maintain and operate your treatment

[12] plant on an average annual basis.

[13] **Q.** And it says 40 years. What does that refer to?

[14] **A.** This is the total O&M cost over a 40-year timeframe.

[15] **Q.** Why did you assume 40 years?

[16] **A.** This was based on Dave Terry's modeling which showed MTBE

[17] concentration sustaining at significant levels out to 2040.

[18] And we projected those trends outwards to try and identify the

[19] entire timeframe in which Station 6 would need to provide MTBE

[20] treatment.

[21] It actually went out past 40 years. For purposes of

[22] our analysis, we just conducted the analysis over a 40-year

[23] period.

[24] **Q.** And does that figure, did you simply take the cost each

[25] year and add them all up, or was there some form of reducing it

Page 5886

[1] to a present value?

[2] **A.** Exactly. The costs that are incurred in the future are

[3] adjusted backwards so that we can represent them in 2009

[4] dollars.

[5] **Q.** And you came up with a total. Looking at the 10 ppb

[6] scenario, tell the jury what you have concluded would be the

[7] total net present value of the cost of operating the system to

[8] remove MTBE.

[9] **A.** For the 10 ppb, the total cost would be approximately \$250

[10] million.

[11] **Q.** And for the 35 ppb scenario, what did you conclude?

[12] **A.** The total costs would be approximately \$258 million.

[13] **Q.** Now, let's look at a couple of these things.

[14] Why -- strike that.

[15] Did you assume that the facility operated continuously

[16] for 40 years?

[17] **A.** Yes, I did assume that.

[18] **Q.** And why did you make that assumption in developing these

[19] cost estimates?

[20] **A.** It's my understanding that the Station 6 plant will be a

[21] backup supply, but the only reasonable assumption to make was

[22] that the facility would need to operate continuously. The city

[23] has a number of planned repairs on its tunnels and aqueducts.

[24] There is the potential for a failure of that supply. And when

[25] the system needs to operate, it needs to operate continuously

Page 5887

[1] for as long as it is needed.

[2] **Q.** With respect to equipment replacement, can you explain a

[3] little bit more about what that means and what assumptions you

[4] made to go into the figures that you have given?

[5] **A.** Yes. The equipment replacement cost basically includes

[6] replacing the equipment every 20 years. So after the equipment

[7] wears out, the GAC vessels and piping will be replaced, and

[8] this cost includes replacement of equipment twice over the 40

[9] years.

[10] **Q.** If the plant were run less than continuously, would the

[11] equipment replacement costs go down?

[12] **MR. STACK:** Objection, your Honor. This is beyond the

[13] scope of the expert's report. It was not mentioned at all or

[14] discussed in the text of the report.

[15] **THE COURT:** This is a point you are going to want to

[16] make anyway. If it is used less than all the time, does the

[17] cost decrease?

[18] **MR. STACK:** Understood, your Honor, but we have no

[19] quantitative opinion being expressed.

[20] **THE COURT:** That may be. But if you want to know the

[21] general answer?

[22] **MR. STACK:** Yes, your Honor, the general answer.

[23] **THE COURT:** Let's start with that.

[24] If it is used less than continuously, in other words,

[25] if it is used sporadically, that would decrease costs, or not?

Page 5888

[1] **THE WITNESS:** Not necessarily. When you let equipment

[2] sit and you don't use it, when you need it, things could have

[3] failed and you might have to spend more money and more funds to

[4] get the system up and running.

[5] **THE COURT:** If you use it less than all the time,

[6] don't you have less wear and tear and less replacement costs?

[7] **THE WITNESS:** Not necessarily. If you are using it

[8] all the time, you are operating and maintaining the equipment

[9] on a normal basis --

[10] **THE COURT:** You had a replacement cost figure, right?

[11] **THE WITNESS:** Yes.

[12] **THE COURT:** If you use something less -- in other

[13] words, I can't say how much less, but make it up, 50 percent

[14] less, don't you have lower replacement costs? Things wear out

[15] less if they are used less; is that not right?

[16] **THE WITNESS:** Not necessarily. Again, equipment wears

[17] out over time. It can wear out just sitting there not being

[18] used.

[19] **THE COURT:** OK. Let me ask you another question. You

[20] may have said this; I don't remember.

[21] Why did you pick 40 years, as opposed to 30 or 35, or

[22] whatever other number?

[23] **THE WITNESS:** That was based on Dave Terry's modeling.

[24] **THE COURT:** Right.

[25] **THE WITNESS:** Which we projected that out to show --

[1] be present past 40 years and require treatment. So we included
[2] an equipment replacement in the year 40 in order to continue to
[3] treat the MTBE.

[4] However, the O&M costs, once we get into years 41, 42,
[5] when we adjust them back to today's dollars, they start getting
[6] a lot smaller. So we simplified the analysis around the
[7] 40-year timeframe.

[8] **Q.** Thank you. Now, so to tie a bow around your cost opinions
[9] for MTBE treatment, if we used GAC at -- assuming a normal peak
[10] of 10 parts per billion, your total MTBE cost was a little over
[11] \$250 million, correct?

[12] **A.** Yes.

[13] **Q.** And if we assume that the MTBE level, again for GAC
[14] treatment, is 35 parts per billion, your opinion is that it
[15] will cost about \$258 million. Both of these figures, that is
[16] the \$250 million figure and the \$258 million figure, are over
[17] 40 years of operation, am I right?

[18] **A.** Yes, that's correct.

[19] **Q.** Why is the difference only \$8 million, given that the peak
[20] levels are so different for MTBE?

[21] **A.** For the GAC system, the number of vessels is going to be
[22] the same for both the 10 ppb and the 35 ppb concentrations.

[23] The driver for sizing those systems is really how much
[24] time the water needs to be in the vessels, that 15 minutes of
[25] contact time in each vessel. So for those range of

[1] **Q.** Did you make a recommendation as between GAC and air
[2] stripping for this facility?

[3] **A.** Yes, I did.

[4] I recommended air stripping based solely on the cost
[5] analyses. I presented both costs because the city often
[6] considers other factors when selecting a treatment technology
[7] to actually build for the plant. And in some cases they may
[8] select a technology that could be more expensive than others.

[9] For example, they might consider the operational
[10] flexibility that a GAC system offers over an air stripping
[11] system. The GAC system, as contaminant levels increase, it can
[12] still operate. You don't have to shut the plant down. You
[13] just have to change out the carbon more frequently. The air
[14] stripping tower, if you exceed that peak value that you
[15] designed the plant for, you may risk losing the plant or, you
[16] know, providing contaminated water to the consumers.

[17] The city also might consider the height of the
[18] building. The air stripping towers are 60 feet tall. They are
[19] going to be a large presence in a community. Whereas the GAC,
[20] they are not as tall, not as great of an impact.

[21] So the city would consider additional factors in
[22] ultimately selecting a technology. So I presented both costs
[23] for that purpose.

[24] **Q.** Are you aware of any situations in which the city has
[25] chosen a more expensive alternative?

[1] concentrations, we want the same number of vessels. So the
[2] capital costs are the same.

[3] So the main difference comes into the O&M costs. At
[4] the 10 ppb, the carbon will last longer before you have to
[5] change it out. At the 35 ppb scenario, you'll have to replace
[6] the carbon more frequently. So that's the main difference in
[7] the costs.

[8] **Q.** And for air stripping at 10 parts per billion, you
[9] concluded that the plant would cost, over the 40 years of
[10] operation, a little over \$127 million, correct?

[11] **A.** Yes, that's correct.

[12] **Q.** And at 35 parts per billion, almost \$161 million; do I have
[13] that right?

[14] **A.** Yes, that's correct.

[15] **Q.** And why the big difference between the -- the bigger
[16] difference between the cost there? It is about a \$32 million
[17] difference?

[18] **A.** Yes.

[19] **Q.** Why is that?

[20] **A.** One of the differences is in the capital costs. At the 35
[21] ppb concentration, another tower needs to be provided.
[22] Additionally, we need more air to remove the MTBE. So we need
[23] bigger blowers, bigger heaters, the vapor phase carbon system
[24] is bigger. So the costs to build the plant for the 35 ppb are
[25] greater than the 10 ppb.

[1] **A.** Yes, I am. For example, the Hillview Reservoir in Yonkers,
[2] New York, it is a 90-acre reservoir. We looked at a couple of
[3] options to cover the reservoir. One was a concrete cover.
[4] Another was a floating cover which it is kind of like a pool
[5] cover. It is a thin membrane floating on the surface of the
[6] reservoir. And the concrete cover was approximately 700
[7] million more dollars than the floating cover in capital costs.

[8] Approximately \$400 million more based on the total life cycle
[9] costs, the initial replacement of the floating cover over time,
[10] the O&M. And the main driver for that decision was really, you
[11] know, they wanted a cover that would protect water quality,
[12] protect against vandalism, and be easier to operate and
[13] maintain in the long term.

[14] **Q.** With respect to your goals of removing -- I'm sorry, I did
[15] not mean to start that sentence.

[16] Have you in the last six years or so come up with
[17] other cost projections for this project?

[18] **A.** Yes, I have.

[19] **Q.** Liz, could you bring up the next slide, please.

[20] And is this a chart that you helped prepare
[21] illustrating your historical cost projections for Station 6?

[22] **A.** Yes, it is.

[23] **Q.** And in July of 2004, did you prepare a technical memorandum
[24] that estimated that the cost of the GAC system would be -- now,
[25] these are just capital costs on this chart, correct?

In The Matter Of:

*THE CITY OF NEW YORK, ET AL v.
EXXON MOBIL CORPORATION, ET AL*

*VOLUME 38
September 30, 2009*

*TRIAL
SOUTHERN DISTRICT REPORTERS
500 PEARL STREET
NEW YORK., NY 10007
212-805-0300*

Original File 99udcitf.txt, Pages 5986-6200 (215)

Word Index included with this Min-U-Script®

Page 6014

[1] report.

[2] You have testified that you projected O&M costs for

[3] the various types of treatment you were proposing in your

[4] opinions here in court, and you offered opinions about those

[5] O&M costs. Do you recall that last Thursday?

[6] A. Yes, I do.

[7] Q. With regard to those O&M costs, you base them on a maximum

[8] of 10 parts per billion for 2033, and can you tell the jury for

[9] your own end cost, what the concentration of MTBE in the other

[10] years other than 2033?

[11] MR. SHER: Objection; mischaracterizes testimony. She

[12] gave two scenarios. One was at 10, one was at 35.

[13] MR. STACK: I am referring to the one at 10.

[14] THE COURT: All right.

[15] BY MR. STACK:

[16] Q. For the analysis you did for 10, Ms. Bell, tell the jury

[17] apart from the year 2033, in those other years what

[18] concentration did you assume for MTBE?

[19] A. I assumed a concentration of 9 PPB for the remaining years.

[20] Q. You developed O&M costs for both GAC system and

[21] air-stripping. Am I correct?

[22] A. Yes, that's correct.

[23] Q. For the GAC system, if you want to double-check, you can,

[24] but I believe you projected O&M costs of 141.5 million over 40

[25] years. Am I correct?

Page 6015

[1] A. Yes, that's correct.

[2] Q. And for the air-stripping system, you estimated O&M costs

[3] of 45.2 million over 40 years. Am I correct?

[4] A. Yes, that's correct.

[5] Q. Both of these O&M estimates were based on 40 years of

[6] continuous pumping at Station 6?

[7] A. Yes, that is correct.

[8] Q. With regard to Station 6, you understand, I believe you

[9] indicated in your September report, that Station 6 would not be

[10] used as a water supply. Am I correct?

[11] A. It is my understanding that Station 6 will be used as a

[12] backup water supply; and, therefore, when it needs to run, it

[13] needs to run continuously for as long as it is needed.

[14] Q. With regard to the O&M costs that you testified to here in

[15] court for Station 6, did you ever develop any cost estimates

[16] based on its use as a backup source for drought, supply outages

[17] or plant maintenance?

[18] A. Again I assumed continuous operation based on the fact that

[19] when it needs to run, it needs to run continuously and for as

[20] long as it's needed.

[21] Q. Did you, as part of your work in this case, do any analysis

[22] to determine how many years Station 6 would be used as a

[23] drought backup well based on historical drought records?

[24] A. No, I didn't do that analysis, but it wasn't needed.

[25] Q. You've testified to the jury that you installed

Page 6016

[1] granular-activated carbon on I believe it was 13 wells in 2002.

[2] Am I correct?

[3] A. It was on 9 wells in 2002. It was 13 GAC systems.

[4] Q. 13 GAC systems and 9 wells?

[5] Those wells were being installed -- pardon me -- being

[6] provided with GAC to be used as backup drought emergency wells.

[7] Am I correct?

[8] A. They were being installed for that drought only as

[9] temporary facilities to get the city through that drought.

[10] Q. In the drought in 2002-2003, were the backup wells that you

[11] equipped with GAC ever pumped?

[12] A. A few of the wells were pumped to distribution for a short

[13] period of time.

[14] Q. Since 2002-2003, have those wells ever been pumped?

[15] A. They have not been pumped to distribution. Some of them

[16] have been pumped to waste.

[17] Q. What do you mean, explain to the jury what you mean by

[18] pumped to waste?

[19] A. Pumping to waste means discharging the water to a sewer,

[20] whether it is a storm sewer or sanitary sewer.

[21] Q. Fair to say since 2003, the drought emergency wells that

[22] you equipped with GAC systems have not pumped water that was

[23] supplied to customers?

[24] A. Well, some of them pumped in end of 2003, beginning of

[25] 2004, but since that time they haven't provided water to

Page 6017

[1] consumers.

[2] Q. In the course of your work on this matter, did you do any

[3] analysis looking at statistics to determine how many years

[4] Station 6 might be pumped in the future based on emergency

[5] outages of water supply?

[6] A. No, I did not do that analysis, but it wasn't needed.

[7] Q. Did you do any statistical analysis to determine how many

[8] years Station 6 would be pumped in the future as a supplemental

[9] supply when and if the Rondout-West Branch tunnel were taken

[10] out of service for maintenance?

[11] A. No, I didn't do that analysis.

[12] Q. Did anyone from the city provide you with a written

[13] schedule to indicate to you how many years the Station 6 wells

[14] would be pumped in the future.

[15] A. No, that information was not provided.

[16] Q. As you sit here today, can you state any opinion to a

[17] reasonable degree of scientific or engineering certainty

[18] regarding how many years Station 6 will actually be pumped as a

[19] backup source in the future?

[20] A. No, that was not part of my analysis. Again for the

[21] purposes of designing costing, the only reasonable assumption

[22] to make was to assume it would operate continuously.

[23] THE COURT: Why do you call that the only reasonable

[24] assumption?

[25] THE WITNESS: Because there are a number of scenarios